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BOTANICAL SURVEY OF ERVEN 4570 AND 4576,

BETTY'S BAY.

Prepared for : Headland Town & Regional Planners, Bellville

Client : Mr N. Meyer

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1. INTRODUCTION AND STUDY AREA

This botanical assessment was commissioned in order to help inform decisions on an application to subdivide erven 4570 and 4576, Betty's Bay. Each erf is approximately 0.7ha in extent, and both lie at the upper, western end of Betty's Bay, along Disa Crescent, and both overlook Grootvlei. The sites lie at the southern base of the Voorberg, which falls within the Kogelberg State Forest, and which forms part of the core area of the Kogelberg Biosphere. The site thus borders on the core area of the Biosphere, and from the information I have available (GIS data from CPU of CapeNature) I assume that the erven fall within the Transitional area of the Biosphere, where urban density should be reduced and development should be environmentally sensitive. The Rooiels to Kleinmond coastal strip has been identified as a sensitive environmental area in the new EIA Supplementation Guidelines (G. Pence – pers. comm), which means that all development applications will have to go through at least a basic assessment process in future.

Altitude is about 30-40masl. Erf 4576 slopes gently to the south, and has no wetlands on the site, although there is a wetland corridor just east of the site. Erf 4570 has a significant wetland covering the southwestern half of the site, and the site slopes moderately to the south.

Plate 1: View looking south over Erf 4576, showing approximate lower edge of site in yellow. The most sensitive botanical areas occur in the foreground.

The sites were visited on 14 November 2006. The vegetation on site is regarded as mature (about seven to twelve years old), and although the survey was conducted in early summer it is felt that a significantly accurate picture of the vegetation could be obtained, partly as a result of extensive previous work in the area, and partly due to the relatively low proportion of rare bulbs and annuals in this vegetation type.

2. TERMS OF REFERENCE

The terms of reference for this study were those recommended by The Botanical Society of South Africa and CapeNature.

- Produce a baseline analysis of the botanical attributes of the property as a whole.
- This report should clearly indicate any constraints that would need to be taken into account in considering the development proposals further.
- The baseline report must include a map of the identified sensitive areas as well as indications of important constraints on the property. It must also:
    - Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.
    - In terms of biodiversity pattern, identify or describe:

Community and ecosystem level

a. The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;
b. The types of plant communities that occur in the vicinity of the site
c. Threatened or vulnerable ecosystems (*cf. new SA vegetation map/National Spatial Biodiversity Assessment, etc.*

Species level

a. Red Data Book species (give location if possible using GPS)
b. The viability of and estimated population size of the RDB species that are present (include the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident)

c. The likelihood of other RDB species, or species of conservation concern, occurring in the vicinity (include degree of confidence).

Other pattern issues

b. Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
c. The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
d. The condition of the site in terms of current or previous land uses.

- In terms of **biodiversity process**, identify or describe:

a. The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
b. Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries)
c. Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
d. Would the conservation of the site lead to greater viability of the adjacent ecosystem by securing any of the functional factors listed in the first bullet?

- Would the site or neighbouring properties potentially contribute to meeting regional conservation targets for both biodiversity pattern and ecological processes?

3. THE VEGETATION

The original natural vegetation in the study area is a combination of two different vegetation types, due to its position at the base of the mountains. It is probably best described as Hangklip Sand Fynbos, with elements of Kogelberg Sandstone Fynbos (Mucina & Rutherford 2003), with the latter elements being more typical of the mountain areas.

Hangklip Sand Fynbos is restricted to the low lying sandy flats between Rooiels and Stanford (mostly on neutral and acid sands), with outliers on the southern Cape Peninsula. The latest National Spatial Biodiversity Assessment (NSBA; Rouget *et al* 2004) has determined that at least 32% of this Hangklip Sand Fynbos vegetation has been lost (1996 data; the situation has deteriorated since then, and this figure is probably closer to 40% now), with ongoing loss and pressures (urbanization, agriculture, quarrying), and thus ranks it as a Vulnerable vegetation type. Only 17% of this vegetation type is formally conserved, with a conservation target of 30%, which can be interpreted as meaning that roughly 50% of every site with this vegetation type should be conserved in order to achieve regional conservation targets. This ranking is similar to a Red Data Book ranking for individual species, the only difference being that it refers to entire ecosystems.

Kogelberg Sandstone Fynbos is well conserved (59% conserved, being 195% of the national target, and 83% remaining), and consequently has a Least Threatened ecosystem status (Rouget et al 2004).

Invasive alien vegetation is not currently a feature of the sites, and the only species noted was rooikrans (*Acacia cyclops*), and this species occurs only as scattered small plants (<0.1% cover).

3.1 Erf 4576

This site is well drained, with white acid sands and very occasional rocks. Dominant species include *Elegia filacea*, *Rhus lucida* (blink taaibos), *Erica axillaris, Erica serrata*, *Erica muscosa*, and *Leucadendron salignum*. Additional species include *Pteridium aquilinum* (bracken), *Osyris speciosa, Leucadendron gandogeri, Restio egregius,Restio festuciformis, Hypodiscus aristatus, Staberoha cernua, Chondropetalum aggregatum, Pentaschistis curvifolia, Tetraria bromoides, Capelio tabularis, Metalasia muricata* and *M. densa* (blombos), *Erica coccinea* (hangertjies), *Erica tenella, Erica imbricata, Chrysanthemoides monilifera* (bietou), *Pelargonium cucullatum, Pterocelastrus tricuspidatus (*kershout), *Cliffortia atrata, Psoralea pinnata* (bloukeur), *Anthospermum aethiopicum, Chionanthus foveolatus* (bastard ironwood), *Watsonia borbonica, Protea cynaroides* (king protea), *Morella quercifolia* (maagpynbossie), *Lanaria lanata* (wolbos), *Berkheya barbata, Hermas villosa,* and *Aspalathus calycina*. On the few large rocks are *Crassula flava*, and *Lachenalia* sp. (viooltjie).

The following species are largely restricted on site to the upper third of the site: *Serruria adscendens, Brunia albiflora* (coffee bush), *Leucadendron xanthoconus, Hermas villosa, Penaea mucronata*, and *Psoralea aphylla.*

The bulk of the site is considered to be of Moderate regional conservation value, with a very limited number of rare species, and because it is (and will become more so) partly isolated from the core mountain area by its position.

3.1.1 Rare species

Only one Red Data Book listed plant species was recorded on this site, and there is a low to moderate likelihood of others being present, but unrecorded (primarily due to seasonal and fire cycle constraints).

Serruria adscendens (Proteaceae; see Plate 2) is largely restricted to the sandy flats between the mountains and the sea in the area from Hanglip to Stanford, and has consequently been affected by urbanization, alien plant invasion, and agriculture. The species has been recently Red Data Book listed as Near Threatened (Rebelo et al – in prep.). The species is not well represented on site, and is present only in the areas indicated in Figure 1. A total of about fifteen plants occur on site, with large populations on the lower slopes of the mountain behind the site.

Plate 2: *Serruria adscendens* is a 0.4m tall member of the Protea family, and is Red Data Book listed as Near Threatened.

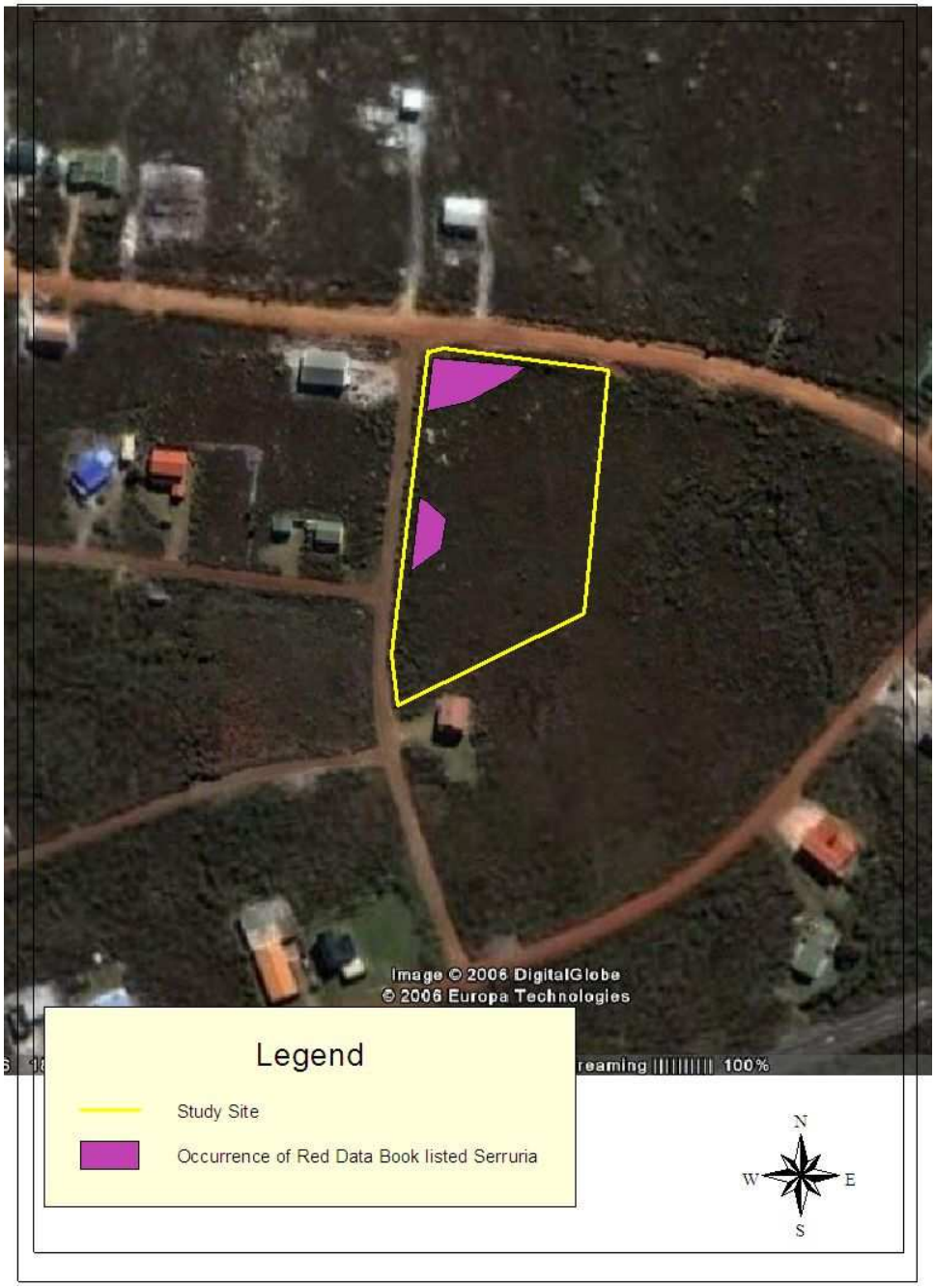

Figure 1: Aerial photo of erf 4576, indicating approximate boundary, and position of no go development areas. The remainder of the site is of Moderate regional conservation value, and presents no significant botanical constraints to development.

3.2 Erf 4570

The vegetation on this erf site consists of two distinct plant communities, although both are categorised as part of the Hangklip Sand Fynbos. The driving factor in this system is the degree of seasonal moisture in the soil, which produces a distinct wetland plant community, and a distinct non-wetland plant community.

The wetland plant community covers the lower 40% of the site, primarily in the southwest (see Figure 2). Characteristic species include *Neesenbeckia punctoria, Brunia albiflora* (coffee bush*), Elegia asperiflora, Psoralea pinnata* (bloukeur), *Osmitopsis asteriscoides* (vleikruid), *Platycaulos compressus, Erica perspicua*, *Cliffortia odorata* (wildewingerd), and *Morella integra*. All these species are restricted to permanently wet sites. All wetlands have a Very High ecological value, and should not be disturbed. DWAF recommends a minimum 23m buffer for all wetlands.

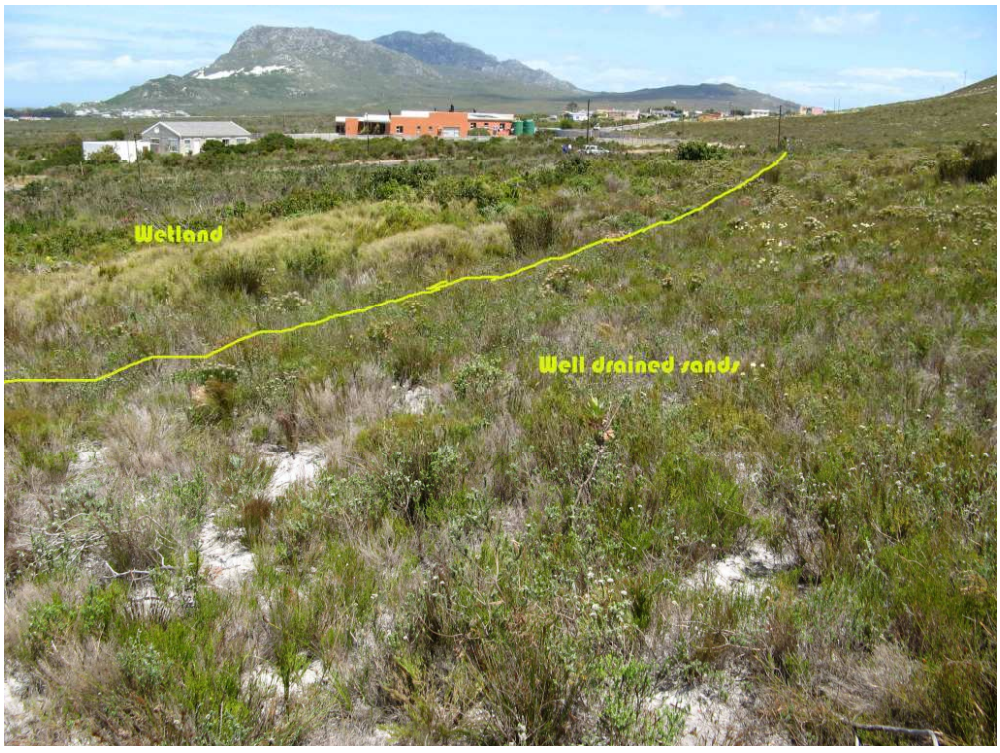

Plate 3: View of erf 4570, looking west. Yellow line shows approximate edge of minimum wetland buffer, with drier sands to the right. Both areas have relatively high conservation value, and the wetland is particularly sensitive, especially to a reduction in surface and subsurface water flow.

The better drained, often stony portion of the site occupies about 60% of the site, and is dominated by a number of indigenous species, including *Pentaschistis curvifolia,*

Restio egregius, Staberoha cernua, Chondropetalum aggregatum, Elegia filacea, *Erica axillaris, Erica serrata*, *Serruria adscendens*, *Spatalla curvifolia*, and *Leucadendron salignum*. Additional species include *Pteridium aquilinum* (bracken), , *Rafnia capensis* ssp. *pedicellata, Osyris speciosa, Tetraria bromoides, Capelio tabularis, Metalasia erubescens* (blombos), *Erica muscosa, Erica tenella, Edmondia sesamoides, Penaea mucronata, Pelargonium cucullatum, Hypodiscus aristatus, Lanaria lanata* (wolbos), *Berkheya barbata, Hermas villosa, Phaenocoma prolifera* (pink sewejaartjies), and *Aspalathus calycina*. Due to the presence of at least two Red Data listed species this area has a High regional conservation value.

3.2.1 Rare or localised species

Two Red Data Book listed plant species was recorded in the drier parts of the site. *Spatalla curvifolia* (Proteaceae) is RDB listed as Near Threatened (Rebelo et al – in prep.; Near Threatened is the lowest category of threat), as although it is still fairly common in parts of its range, it is threatened by urbanization, alien vegetation, and agricultural expansion (mainly vineyards). The species is common on the drier sands, with at least 60 plants noted, and this is thus regarded as a viable and significant population.

Serruria adscendens (Proteaceae) is largely restricted to the sandy flats between the mountains and the sea in the area from Hanglip to Stanford, and has consequently been affected by the same factors as *Spatalla curvifolia*. The species has thus also been recently RDB listed as Near Threatened (Rebelo et al – in prep.). The species is common in the same areas as the *Spatalla*, and at least 70 plants are found on site, with large, viable populations just north of the site as well.

There is a low likelihood of further threatened or localised species occurring on site, notably in the form of bulbs, which are typically highly seasonal in terms of flowering. The Vulnerable *Mimetes hirtus* (Proteacae) occurs in the wetland immediately in front of this erf, but is not currently present on the study site.

Figure 2: Aerial image of Erf 4570, showing extent of wetland area, proposed wetland buffer, and preferred development area (lower sensitivity area). Note that numerous plants of two Red Data Book listed plants occur in the High conservtion value area.

4. COMMENTS ON CONTEXT OF THE SITE

Erf 4570 is situated adjacent to the Kogelberg Biosphere Reserve Core Area, and would appear to be within the Transitional area of the Biosphere, and as such is an important area, where urban density is supposed to be reduced, and in this regard it would appear to be unwise to approve a subdivision. If subdivision is approved, it must be for a maximum of two large erven with all development footprints along the eastern boundary. Erf 4576 is slightly further down the slope, and is not on the edge of the Biosphere Core, and thus has fewer constraints from a regional persepctive.

There are no clear, major edaphic (soil) interfaces on the sites, but they are part of an important upland - lowland link which connects Grootvlei to the mountains. Upland – lowland gradients like this are regarded as important elements of ecological processes (see Terms of Reference), and should be conserved where possible (de Villiers 2005). The maintenance of links like this are important for pollinators and seed dispersers, such as insects and birds, and a row of houses could theoretically prove to be an obstacle for certain insects. The upland-lowland link also has drainage implications for Erf 4570, outlined below.

The ecological viability of the permanent wetland area on Erf 4570 could be negatively affected by what happens on this site, as the catchment areas for the wetlands are partly on the site (see Terms of Reference). Degradation of the wetlands in the Betty's Bay area is an ongoing, major problem for a number of rare plants and animals, and this alteration takes the form of habitat loss, alteration of moisture regime, pollution, and reduced fire frequency. The wetland community on the site will be severely negatively affected by any development on the upslope side. This can be seen on the adjacent property (to the east) where downslope vegetation is dying due to artificial drying out associated with the large house on the site. Any development on Erf 4570 thus needs to be carefully planned to avoid impacts on the wetlands.

5. CONCLUSIONS

- Figures 1 and 2 should be used as planning guidelines.
- Erf 4576 presents few botanical constraints to development, whilst Erf 4570 presents significant botanical constraints to development.
- The following mitigation measures must be applied to any approvals.

Mitigation of development for Erf 4576

- Two well demarcated populations of a Red Data Book listed plant species occur on this erf, and these should be buffered by at least 10m from any development. It is proposed that the erf could be subdivided, with development footprints specified for all erven, and these development restrictions should be written into the Title Deeds. The sensitive areas can fall within individual erven, but the sensitive areas may not be developed and must be identified as conservation areas.
- The approved erven should be subject to strict environmental controls, including the condition that no formal gardens be allowed on the site, with development disturbance restricted to an area within 2m of the house walls. Each house site should thus have a maximum designated development envelope of no more than 300$m^{2,}$, which includes decks, parking areas, yards, etc. These restrictions should go into the Title Deeds.
- As it is understood that the proponent does not wish to personally develop any subdivided erven any ROD issued in terms of this application will not necessarily be binding on the future purchasers, and thus an EMP cannot be mandatory at this stage. Management of the subdivided erven is thus unlikely to be regulated, and the only controls lie in what is put into the Title Deeds.
- Fire is one of the key ecological drivers in Fynbos systems such as this. One of the requirements for the persistence of the Red Data Book listed plant species, and other reseeding plant species, is that the vegetation be burnt at least once every fifteen to twenty years, as these species require fire in order to stimulate germination. Without fire for more than twenty years, these and various other species, are likely to become locally extinct, which is an indirect and significant negative effect of urbanization that is usually overlooked. It is thus essential that the design of the houses take this into account, as there is highly likely to be a wildfire in the area at least once every twenty years.
- The biodiversity specialists must approve the final layout in writing, and should contribute to layout design until this point is reached.

Mitigation of development for Erf 4570

- Development within wetlands and their immediate catchments and appropriate buffer areas should be strongly discouraged, particularly in instances like this where the wetland feeds important downstream wetlands. It must thus be noted that the entire western half of the site is an important catchment for the wetlands in the southwestern portion (and supports at least two Red Data listed plant species), and no development should be undertaken here.
- A cut-off drain should on no account be constructed across the site, as this will have a very negative impact on the subsoil drainage, and will almost certainly lead to local extinction of the wetland plant species on site.
- A buffer of at least 5m has been identified in Figure 2, and no development should occur within this buffer area.
- It is strongly recommended that all development footprints be kept to the eastern boundary of the site (within the area identified in Figure 2 as being of Lower Sensitivity), to minimise impacts on the wetland, and to concentrate disturbance in one area. It may thus be necessary to limit the total number of erven to two large erven.
- Development footprints must be specified for all erven, and these development restrictions should be written into the Title Deeds. The sensitive areas can fall within individual erven, but the sensitive areas (wetlands and buffer, and the bulk of the western part of the site) may not be developed, and must be identified as conservation areas.
- The approved erven should be subject to strict environmental controls, including the condition that no formal gardens be allowed on the site, with development disturbance restricted to an area within 2m of the house walls. Each house site should thus have a maximum designated development envelope of no more than 300$m^{2,}$, which includes decks, parking areas, yards, etc. These restrictions should go into the Title Deeds.
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6. REFERENCES

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